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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,240	02/11/2002	Fei Mao	23390-000101/US	9109
30593	7590	07/27/2005	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195			CARTER, AARON W	
			ART UNIT	PAPER NUMBER
			2625	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/071,240

Applicant(s)

MAO ET AL.

Examiner

Aaron W. Carter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-8,10-12,14,15,18,20-24 and 26-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,14,15,18,20,21 and 26-35 is/are rejected.
- 7) ☒ Claim(s) 7,8,10-12 and 22-24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This action is responsive to papers filed on May 2, 2005.

#### ***Response to Amendment***

2. In response to applicant's amendment received on March 31, 2005, all requested changes to the claims have been entered. Claims 30-35 have been added. Claims 3, 9, 13, 17, 19 and 25 have been cancelled.

#### ***Response to Arguments***

3. Applicant's arguments filed May 2, 2005 have been fully considered but they are not persuasive.

Applicants argue that none of the prior art teach or fairly suggest "determining a seed point in the volume defining array in response to the selection by the user of a pixel in the view of the volume being displayed" and "growing a region in three dimensions about the seed point".

Examiner disagrees, the prior art of Hartley (already of record) discloses determining a seed point in the volume defining array (column 4, lines 10-12 and 26-30, wherein the seed point is determined in one of the images making up the 3D volume) in response to the selection by the user of a pixel in the view of the volume being displayed (column 4, lines 5-12, wherein the view of the volume is a 2D slice of it being displayed on the visual display) and growing a region in three dimensions about the seed point (column 4, lines 26-30, wherein after the seed point is

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selected the region is automatically tracked or grown through the other images of the three spatial dimensions).

### *Drawings*

4. Drawings submitted on April 4, 2005 were not entered because of non-compliance.

When submitting corrected drawings they must be labeled "Replacement Sheet". Please refer to 37 CFR 1.121(d).

### *Claim Rejections - 35 USC § 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 30-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 recites the limitation "into adjacent voxels" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 33 recites the limitation "into adjacent voxels" in line 2. There is insufficient antecedent basis for this limitation in the claim.

*Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 4-6, 15, 18, 20, 21 and 27-35 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 5,903,664 to Hartley et al. ("Hartley").

As to claim 1, Hartley discloses a method of selecting a portion of a 3D volume (column 2, lines 1-11), the portion of the volume containing a feature of interest, a view of the volume being displayed on a display, the view being generated from a volume-defining array containing data corresponding to properties at points within a coordinate system containing the volume, the volume-defining array being stored by an image processing system, and a user having a user interface for interacting with the image processing system (Fig. 1), the method comprising the steps of:

(a) determining a seed point in the volume defining array in response to the selection by the user of a pixel in the view of the volume being displayed (column 4, lines 5-12 and 26-30, wherein the seed point is determined in one of the images making up the 3D volume and wherein the view of the volume is a 2D slice of the volume being displayed on the visual display); and

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(b) growing a region in three-dimensions about said seed point, wherein the growth of said region is responsive to input from the user interface, such that manipulation of the user interface selectively determines the extent of the growth of said region (column 3, line 50 – column 4, line 14, wherein region growing is responsive to the ROI, seed point and threshold input from the user interface and column 4, lines 26-30, wherein once the ROI, seed point and threshold are selected the region is automatically tracked or grown through the volume or other images in three spatial dimensions).

As to claim 2, Hartley discloses the method defined in claim 1, wherein said step of growing said region comprises an iterative series of steps, the steps comprising:

Evaluating an untested point in the volume defining array adjacent to a boundary member point to determine if the untested point is a member of said region, said boundary member point being said seed point for a first iteration and said boundary member point being a member point at the boundary of said region for subsequent iterations (column 2, lines 12-35);

Adding to said region the untested points that are determined to be members of said region (column 2, lines 12-21 and column 3, lines 43-58);

Excluding from said region the untested points that are determined not to be members of said region (column 2, lines 12-21 and column 3, lines 43-58); and

Visually distinguishing, on the view of the volume being displayed, the points determined to be members of said region from other points (column 3, lines 59-62),

Wherein the number of iterations performed is responsive to the user interface, such that manipulation of the user interface selectively determines the extent of the growth of said region (column 3, line 64 – column 4, line 14).

As to claim 4, Hartley discloses the method defined in claim 1, wherein said view of the volume being displayed comprises a sectional view of said 3D volume and the method further comprising the step, prior to step (a), of displaying said sectional view in response to user selection of a sectional plane through said 3D volume (column 3, lines 34-42, column 3, lines 66-67 and column 4, lines 6-9 and 15-30).

As to claim 5, Hartley discloses the method defined in claim 4, wherein said sectional view includes a portion of said feature of interest (column 3, lines 34-42, column 3, lines 66-67 and column 4, lines 6-9 and 15-30), and wherein said pixel selected by the user for determining a seed point comprises a pixel located within the feature of interest (column 4, lines 10-12).

As to claim 6, Hartley discloses the method defined in claim 4, and wherein said step of visually distinguishing comprises blacking out the pixels in said sectional view corresponding to points in the volume defining array determined to be member points of said region (column 4, lines 15-25)

As to claim 15, Hartley discloses the method defined in claim 1, wherein said user interface comprises a device selected from the group comprising a keyboard, a mouse, a trackball, a touch pad, a microphone and a pen (column 4, line 6 and Fig. 1 element 5).

As to claim 18, please refer to the rejections made for claim 1 above.

As to claim 20, please refer to the rejections made for claim 4 above.

As to claim 21, please refer to the rejections made for claim 6 above.

As to claim 27, please refer to the rejections made for claim 2 above.

As to claim 28, please refer to the rejections made for claim 1 above.

As to claim 29, please refer to the rejections made for claim 1 above.

As to claim 30, Hartley discloses the method defined in claim 1, wherein said step of growing said region included iteratively growing said region into adjacent voxels meeting member criteria, and wherein a number of iterations is selectively adjusted by the user through the user interface (column 4, lines 15-25, wherein the region is grown about the seed in accordance with the threshold selected by the user, and repeatedly grown when the user adjusts the threshold).

As to claim 31, Hartley discloses the method defined in claim 30, further including a step of displaying, at each iteration, the extent of growth of said region (column 4, lines 15-20, wherein the extent of growth is shown in a new color).



As to claim 32, Hartley discloses the method defined in claim 31, wherein the view of the volume being displayed includes at least one sectional view of the volume and said step of displaying includes displaying the extent of the growth of said region within said sectional view (column 3, lines 59-62 and column 4, lines 15-25).

As to claim 33, please refer to the rejection of claim 30 above.

As to claim 34, please refer to the rejection of claim 31 above.

As to claim 35, please refer to the rejection of claim 32 above.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 14 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartley.

As to claim 14, Hartley discloses the method defined in claim 1, including the use of MRA, but neglects to explicitly disclose that the data is ultrasound data. However, Hartley's method is generally applicable to all types of 3D volume data (column 2, lines 6-11). The Examiner takes Official Notice that the use ultrasound data in creating medical imaging is well known in the art. It would have been obvious to one of ordinary skill in the art at the time of the

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invention to use ultrasound data in the method of selecting a portion of a 3D volume as disclosed by Hartley.

As to claim 26, please refer to the rejection of claim 14 above.

*Allowable Subject Matter*

10. Claims 7, 8, 10-12 and 22-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

**11. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 6,828,966 to Gavriliu et al. discloses region growing in 3D.

USPN 6,898,303 to Armato, III et al. discloses region growing in 3D.


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron W. Carter whose telephone number is (571) 272-7445. The examiner can normally be reached on 8am - 4:30 am (Mon. - Fri.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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